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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

TEST 1

Winter Semester: 2021 - 22

Course Code: CSE2010

Course Name: Operating Systems

Program & Sem: B.Tech & VI Sem

Date: 09th May 2022

Time: 11.30 AM to 12.30 PM

Max Marks: 30

Weightage: 15%

Instructions:

- (i) Read the questions carefully and answer accordingly.
- (ii) All questions are compulsory

Part A [Memory Recall Questions]

Answer both the Questions. Each question carries FIVE marks. (2Qx 5M= 10M)

Q.NO.1.a. The term used for number of processes completed per unit time is _____.
(CO2, Knowledge)

1.b. The process moves from _____ to _____ state when input/output service is completed.
(CO2, Knowledge)

1.c. The interval from the time of submission of a process to the time of its first response is termed as _____.
(CO2, Knowledge)

1.d. A process may get terminated due to _____
(CO2, Knowledge)

- i. completed the execution(normal exit)
- ii. fatal runtime error
- iii. killed by another process(parent/kernel)
- iv. all the above

Q.NO.2. What is the purpose of the given system calls?

(a) fork() (b) wait() (c) exec [CO1, Knowledge]

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries FOUR marks. (3Qx4M=12M)

Q.NO.3. Illustrate Microkernel System Structure. Mention the advantages of this approach to operating system design
(CO1, Comprehension]

Q.NO.4. a> Justify the statement: "In some ways cloud computing is a logical extension of virtualization."

b> Below is the system requirements for Marvel's Avengers Game.

OS: Windows 10 (64-bit)

CPU: Intel® Core™ i7-4770K processor or better

RAM: 16GB

Graphics Card: NVIDIA GeForce GTX 1060 or AMD Radeon RX 480

Storage: At least 110 GB of available space

List two main reasons[in bulleted points only] with justification[one sentence for each reason] why they are recommending: Intel® Core™ i7-4770K processor or better

(CO1) [Comprehension]

Q.NO. 5. A program in execution is called a process. Summarize[the transitions] the different states of the process with an appropriate diagram. (CO2) [Comprehension]

Part C [Problem Solving Questions]

Answer both the Questions. Each question carries FOUR marks. (2Qx4M=8M)

Q.NO.6. Suppose there are five processes, arrival time and burst time of each process is given in the table. Draw the Gantt chart and compute the average waiting time and average turnaround time using FCFS scheduling algorithm. (CO2) [Application]

Process ID	Arrival Time	Burst Time
P1	4	5
P2	6	4
P3	0	3
P4	6	2
P5	5	4

Q.NO.7. Consider the following set of processes, with the length of the CPU-burst time given in milliseconds.

<u>Process</u>	<u>Burst Time</u>
P1	10
P2	29
P3	3
P4	7
P5	12

The processes are assumed to have arrived in the order P1, P2, P3, P4, and P5. Draw a Gantt chart illustrating the execution of these processes using FCFS scheduling algorithms. Calculate the Average waiting time and Average turnaround time (CO2) [Application]



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**PRESIDENCY UNIVERSITY
BENGALURU
SCHOOL OF ENGINEERING**

TEST 2

Winter Semester: 2021 - 22

Course Code: CSE2010

Course Name: Operating Systems

Program & Sem: BTECH & IV Semester

Date: 1st June 2022

Time: 11.30AM to 12.30PM

Max Marks: 30

Weightage: 15%

Instructions:

(i) *Read the questions carefully and answer accordingly.*

(ii) *All questions are compulsory*

Part A [Memory Recall Questions]

Answer both the Questions. Each question carries FIVE marks.

(2Qx 5M= 10M)

Q.NO.1. Name the following:

a. Three parameters to be satisfied by any solution to the critical section problem

[3M](CO3, Knowledge)

b. Two atomic operations permissible on semaphores?

[2M] (CO3, Knowledge)

Q.NO.2. Distinguish between preemptive and non-preemptive Scheduling. [5M] (CO2, Knowledge)

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries FOUR marks.

(3Qx4M=12M)

Q.NO.3. Define race condition. Illustrate it using the relevant code for producer consumer problem.
[4M] (CO3, Comprehension)

Q.NO.4. What is a spin lock? What are its advantages and disadvantages?

[4M] (CO3, Comprehension)

Q.NO.5. Illustrate how Test_and_Set can satisfy bounded wait. Write the relevant code.

[4M] (CO3, Comprehension)

Part C [Problem Solving Questions]

Answer both the Questions. Each question carries FOUR marks.

(2Qx4M=8M)

Q.NO.6. Consider the given set of processes. Draw Gantt chart and Compute average waiting time and average turnaround time when Pre-emptive priority scheduling is used

[4M] (CO2, Application)

Jobs	Arrival Time	Burst Time	Priority
P1	0	6	2
P2	2	4	3
P3	3	3	1
P4	5	5	2

Q.NO.7. Consider the given set of processes. Draw Gantt chart and compute average waiting time and average turnaround time when the scheduling technique is Round Robin scheduling with a time quantum of 2ms.

[4M](CO2, Application)

Process	Arrival time	Burst time
P1	0	3
P2	2	4
P3	3	2
P4	5	3



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SCHOOL OF ENGINEERING

END TERM EXAMINATION

Winter Semester: 2021 - 22

Course Code: CSE2010

Course Name: OPERATING SYSTEMS

Program & Sem: BTECH – IV Sem (Allied)

Date: 28th June 2022

Time: 9.30 am to 12:30 pm

Max Marks: 100

Weightage: 50%

Instructions:

(iii) Read the all questions carefully and answer accordingly.

(iv) All questions are compulsory

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries 10 marks.

(3Qx 10M= 30M)

1. A. What is an Operating system? Explain its functions (4M)(CO1) [Knowledge]
B. Draw neat diagrams and explain the following OS structures.
 - i. Layered Approach
 - ii. Microkernel Approach (6M)(CO1)[Knowledge]
2. With the help of a neat diagram, explain the different states of a process and the transitions between states. (CO2) [Knowledge]
3. Explain the necessary conditions for deadlock to occur. Indicate how many of these should occur for deadlock to happen. (CO3) [Knowledge]

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries 10 marks.

(4Qx10M=40M)

4. A. Name an open-source operating system for mobile phones. List out the three important challenges you encounter while designing Operating Systems for mobiles and tablets. (6M) (CO1) [Comprehension]
B. Consider a memory device access is to be done by user of UNIX operating system. With the help of UNIX System Structure diagram, explain the layers and their interaction (4M) (CO1) [Comprehension]
5. What is interprocess communication? Explain the different models of inter process communication. (CO2) [Comprehension]
6. You already know the solution to the bounded buffer producer-consumer problem using semaphores. Now we have a slight change in situation. We have unbounded buffer at our disposal. Provide the solution to the unbounded buffer producer-consumer problem using semaphores. (CO3) [Comprehension]
7. Consider the following Segment Table. Given STLR=5, find the physical addresses for the following logical addresses?

- a) 0, 430 b) 1, 10 c) 2, 500 d) 3, 400 e) 4, 112 f) 5, 121

Segment	Base	Limit
0	219	600
1	2300	14
2	90	100
3	1327	580
4	1952	96

(CO4) [Comprehension]

Part C [Problem Solving Questions]

Answer all the Questions. Each question carries 10 marks.

(3Qx10M=30M)

8. Consider the given set of processes. Compute average waiting time and average turnaround time for the following scheduling algorithms
 i) Preemptive SJF ii) RR(time quantum = 3ms).

Process	Arrival time	Burst time
P1	1	8
P2	2	4
P3	3	2
P4	4	3

(CO2) [Application]

9. Assume there are 5 process P0 to P4 and 3 types of resources. The state at time T0 is given below. Apply Banker's algorithm and answer the following
 a) What is the content of NEED matrix?
 b) Is the system in a safe state?
 c) If a request from Process P2 (0, 0, 2) arrives, can it be granted immediately?

Allocation				Max				Available		
	A	B	C		A	B	C	A	B	C
P0	0	0	2	P0	0	0	4	1	0	2
P1	1	0	0	P1	2	0	1			
P2	1	3	5	P2	1	3	7			
P3	6	3	2	P3	8	4	2			
P4	1	4	1	P4	1	5	7			

(CO3) [Application]

10. Given memory partitions/holes of 100K, 500K, 200K, 300K and 600K are available (in order), apply first fit, best fit and worst fit algorithm to place processes of size 212K, 417K, 112K and 426K (in order). Which algorithm makes the most efficient use of memory?

(CO4) [Application]